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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/697,481	10/26/2000	Puranjoy Bhattacharya	7416/78600	3580
24628	7590	05/06/2004	EXAMINER	
WELSH & KATZ, LTD 120 S RIVERSIDE PLAZA 22ND FLOOR CHICAGO, IL 60606			STORM, DONALD L	
			ART UNIT	PAPER NUMBER
			2654	5

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/697,481

Applicant(s)

BHATTACHARYA ET AL.

Examiner

Donald L. Storm

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/26/00 through 4/16/01.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15 and 16 is/are allowed.
- 6) ☒ Claim(s) 1-5, 8, 17-19 and 27-30 is/are rejected.
- 7) ☒ Claim(s) 6, 7, 9-14 and 20-26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s) <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR § 1.83(a) because they fail to clearly show significant features of the subject matter sought to be patented. See MPEP § 608.02(d). At a minimum, representation of the following features should be added to the drawings to show the claimed invention as a whole:

- a. inverse filtering (claim 1 and others);
- b. a sequence and its FFT (claim 8);
- c. $P(k)$, $H(k)$, and their inverse relation and relation to $R(m)$, $R(m)$ (claim 8);
- d. preparing Yule-Walker, solving Yule-Walker (claim 8);
- e. designing inverse filter using coefficients (claim 8 and others);
- f. noisy ambient (claim 15);
- g. $H(\omega)$ and modeling it by moving average (claim 15).

Corrected drawings (or drawings with proposed corrections highlighted, preferably in red ink) are required in response to this Office action. Corrections may no longer be held in abeyance and ANY REQUEST TO HOLD CORRECTIONS TO THE DRAWINGS IN ABEYANCE WILL NOT BE CONSIDERED A *BONA FIDE* ATTEMPT TO PROVIDE A COMPLETE REPLY.

See 37 C.F.R. § 1.121(d) and § 1.85(a), published September 8 and September 20, 2000.

Claim Informalities

2. Claims 6-7, 9-14, and 20-26 are objected to as being (directly or indirectly) dependent upon a rejected base claim. See MPEP § 608.01(n)V. The claim(s) would be allowable over the prior art of record if rewritten to include all of the limitations of the base claim and any

intervening claims. If any objections appear in this Office action, the claim(s) should also be rewritten to overcome them.

3. Claim 22, and by dependency claim 23, are objected to because the term “medium filter” (line 1) is not defined. The rule that the Applicant can act as his own lexicographer does not apply if written description does not clearly define unusual claim terms. If this is as intended, the Examiner asks that the Applicant indicate a specific part of the specification for understanding this claim element.

4. Claim 23 is objected to for the same reasons as claim 22 because the limitations are recited using obviously similar phrases.

5. Claim 26 is objected to for the same reasons as claim 22 because the limitations are recited using obviously similar phrases.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Nakajima

7. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Nakajima et al. [US Patent 4,283,601].

8. Regarding claim 1, Nakajima [at column 1, lines 43-55] describes processing a signal having transmission path characteristics by a method recognizable as a whole to one versed in the art by explicitly describing the content and functionality of the recited limitations as the following terminology:

inverse filtering a signal before processing the input signal and processing the input signal [at column 7, lines 38-45, as passing speech data through the inverse filter and, having passed, the signal is sent to a parameter extracting circuit that extracts a parameter for recognition];

the signal is input having transmission path characteristics [at column 1, lines 24-26, as the input speech having passed through the network is distorted under the influence of the transmission].

and the transmission path characteristics are reduced [at column 1, lines 47-49, as passing through the inverse filter cancels the influence of the transmission characteristic].

Mirfakhraei

9. Claim 8 is rejected under 35 U.S.C. 102(e) as being anticipated by Mirfakhraei [US Patent 6,512,789].

10. Regarding claim 8, Mirfakhraei [at column 3, lines 41-43] describes processing a signal having transmission path characteristics by a method recognizable as a whole to one versed in the

art by explicitly describing the content and functionality of the recited limitations as the following terminology:

obtaining a sequence h for $n=0$ to $N-1$ [at column 6, lines 10-13, as receive signal and convert to samples x , for $p=1$ to p];

FFT of an obtained sequence to determine $H(k)$ [at column 6, lines 22-27, as FT function of $x(n)$ to determine $FT(x(n))$];

obtain $P(k)$ by using $H(k)$ [at column 6, lines 22-27, as determine magnitude $H(f)$ using $FT(x(n))$ in the *{which necessarily determines magnitude $-H(f)$ -squared using $FT(x(n))$ -squared in denominator, see Equation 2}*];

take IFFT of $P(k)$ to obtain $R(m)$ [at column 6, lines 45-64, as $R = IFT(\text{magnitude-}H(f)\text{-squared})$];

$m=0$ to $M-1$ [at column 6, lines 63-64, as M coefficients for $R(1)$ to $R(p)$];

prepare Yule-Walker equations using the $R(m)$ values [at column 5, lines 43-44, as use Yule-Walker equations which contain AC estimates of the received signal];

solve the Yule-Walker equations to obtain coefficients [at column 5, lines 44-45, as solving the Yule-Walker equations provides coefficients];

use the obtained coefficients to design an inverse filter [at column 8, lines 51-54, as design a filter given a desired response to equalize the channel];

preprocess the signal having transmission path characteristics [at column 4, lines 41-43, as TEQ filter incoming samples to reduce distortion across the channel];

the preprocessing is with the inverse filter [at column 8, lines 51-54, as the time-domain equalizer initialization designed a filter given a desired response to equalize the channel].

Russel

11. Claims 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Russel [US Patent 5,353,310].

12. Regarding claim 17, Russel [at column 3, lines 59-68] describes processing received encoded data by a method recognizable as a whole to one versed in the art by explicitly describing the content and functionality of the recited limitations as the following terminology:

preprocessing received encoded data before decoding the data and decoding the data [see Fig. 1, items 2, 4, 10, 12, 13, 22 and their descriptions, especially at column 4, lines 43-67, of the output of coding means having channel transfer function being input to the receiver for subtracting and quantizing before passing to the decoding means].

13. Regarding claim 18, Russel also describes:

a parameter processor performs preprocessing and communicates with the decoder [see Fig. 1, items 12, 13, 22, and their description, especially at column 6, lines 27-32, of subtractor and quantizer 13, which provides one of assumed symbol values, provides an output to the decoder].

14. Regarding claim 19, Russel also describes:

the received encoded data is received from an encoder in communication with the parameter processor [see Fig. 1, items 2, 4, 10, 12, 13, 22 and their descriptions, especially at column 5, lines 30-43 of coding means connected to subtractor and quantizing means over a communications channel and filter.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Nakajima and Jacobs

16. Claims 2, 3, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. [US Patent 4,283,601] in view of Jacobs et al. [US Patent 5,956,683].

17. Regarding claim 2, Nakajima also describes:

an inverse filter is used to filter the input [at column 3, lines 47-49, as subjecting data in the input to inverse filtering].

Following the inverse filter, Nakajima processes the input signal with a speech recognizer in communication with the inverse filter. Nakajima does not explicitly describe processing by an encoder in communication with the inverse filter.

Jacobs [at column 1, lines 33-40] also describes speech recognition following a preprocessor that discards channel distortion. Jacobs [at Fig. 1] describes the preprocessor in communication with the speech recognition process. In Jacobs, the description includes:

an encoder is used to process the input signal [at column 10, lines 50-59, as a voice coder extracts the acoustic features].

To the extent that Nakajima's production of a recognition result based on the output of the inverse is not necessarily processing by an encoder, it would have been obvious to one of ordinary skill in the art of speech recognition at the time of invention to include Jacobs's concept of a voice coder in communication with the inverse filter to provide the acoustic features because Jacobs [at column 5, lines 2-12] points out that the acoustic features can be sent to a remote recognition processor so that less processing power is required in the user's local apparatus.

18. Regarding claim 3, Jacobs also describes:

a MBE encoder [at column 10, lines 64-66, as MBE based vocoder]; and .

Nakajima also describes:

the inverse filter frequency response has a smooth middle and peakiness at extremities of the frequency response [at column 3, lines 36-39, as the transmission characteristic of the inverse filter becomes that shown in Fig. 2(f)].

19. Claim 27 sets forth limitations similar to claim 1 and additional limitations similar to limitations set forth in claim 2. Nakajima and Jacobs describe and make obvious the limitations as indicated there.

Nakajima and Jacobs and Mirfakhraei

20. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. [US Patent 4,283,601] in view of Jacobs et al. [US Patent 5,956,683] and Mirfakhraei [US Patent 6,512,789].

21. Regarding claim 4, neither Nakajima not Jacobs explicitly describes an all-pole construction of the inverse filter.

Mirfakhraei [at column 3, lines 41-43] also describes processing a signal having transmission path characteristics, and Mirfakhraei describes:

an inverse filter [at column 8, lines 51-54, as a filter given a desired response to equalize the channel];

filter poles [at column 5, line 41, as poles (denominator equations)];

an all-pole filter [at column 7, line 64-column 8, line 3, as no numerator taps, the filter is modeled by a denominator estimate].

It would have been obvious to one of ordinary skill in the art of filter design to include Mirfakhraei's concepts because using only the denominator equations as Mirfakhraei proposes would provide fewer equations to implement and execute in a processor than using the pole equations and the numerator equations also.

22. Regarding claim 5, Mirfakhraei also describes:

a low order filter of about 6 poles [at column 5, lines 61-66, as in the filter about 10 taps are sufficient].

Nakajima and Jacobs and Nishigushi

23. Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. [US Patent 4,283,601] in view of Jacobs et al. [US Patent 5,956,683] and Nishigushi [US Patent 5,749,065].

24. Regarding claim 28, Jacobs also describes:

a parameter preprocessor including receiving means for receiving the encoded signal data in communication with the encoder [at column 5, lines 36-47, as receiving means which performs functions on the transmitted features including receiving features coded by the transmitter and transmitted to the receiver].

Although, Jacobs [at column 2, lines 63-67] describes a vocoder and telephone environment, Jacobs shows only the word recognition aspect of the communications system. Jacobs does not include details of voice coding and decoding for any of the exemplary vocoders. In particular, neither Jacobs nor Nakajima explicitly describes a synthesizer or a decoder for synthesizing speech.

Nishigushi [at column 17, lines 49-67] describes speech encoding and decoding suitable for transmission in Jacobs exemplary vocoder environments. Nishigushi describes:

a parameter preprocessor including receiving means for receiving the encoded signal data in communication with the encoder [see Fig. 7, items 31, 41, 43, 46, and their descriptions, especially at column 14, lines 37-67, of supplying the VQ index of LSP, the pitch, the V/UV decision, and the spectral envelope from the speech encoder to the speech decoder];

preprocessing means for preprocessing the received encoded signal data and decoding means to decode the preprocessed signal data in communication with parameter preprocessor [see

Fig. 7, items 33, 34, 45, 42, and their descriptions especially at column 14, lines 43-67, of a vector dequantizer, interpolator, converter, and inverse quantizer receiving the encoded parameters];

synthesizing means for synthesizing the preprocessed signals into speech [see Fig. 7, items 35, 36, 37, and their descriptions especially at column 14, line 58-column 15, line 9, of synthesizer circuit to carry out synthesis using parameters from the interpolator, converter, and MBE synthesis].

As Nishigushi provides the details that an artisan

The environment of Jacobs requires an apparatus for vocoding, but merely any conventional vocoding method. Jacobs suggests MBE as suitable. Accordingly, an artisan would be motivated to find known vocoding systems in order to implement Jacobs's telephone environment. Nishigushi's descriptions provide speech parameter coding, decoding, and synthesis devices suitable for implementing Jacobs and Nakajima's processes and Jacobs's communications functions. It would have been obvious to one of ordinary skill in the art of vocoding at the time of invention to include Nishigushi concepts of decoding and synthesis with Jacobs and Nakajima because Nishigushi [at column 17, lines 31-48] points out the advantages that an artisan could expect of higher clarity of the synthesized sound, low probability of quantization error, and enhancement of UV portions of speech.

25. Regarding claim 29, Nakajima also describes:

storage for encoded data in the encoder [at column 7, lines 38-61, as parameter register for holding parameters of input speech output from parameter extraction for recognition].

Jacobs also describes:

transmission means to transmit encoded data [at column 5, lines 35-43, as transmitter which codes and transmits].

26. Claim 30 sets forth limitations similar to limitations set forth in claim 27 and with additional limitations similar to claim 28. Nakajima, Jacobs, and Nishigushi describe and make obvious the limitations as indicated there.

Allowable Subject Matter

27. Claims 15-16 are allowed. Claims 6-7, 9-14, and 20-26 recite allowable subject matter when considered with the limitations of the base claims and intervening claims.

Conclusion

28. Any response to this action should be mailed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9306, (for formal communications intended for entry)

Or:

(703) 872-9306, (for informal or draft communications, and please label "PROPOSED" or "DRAFT")

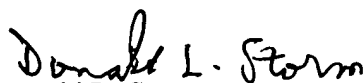
Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA (Sixth Floor, Receptionist)

29. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald L. Storm, of Art Unit 2654, whose telephone number is

(703) 305-3941. The examiner can normally be reached on weekdays between 8:00 AM and 4:30 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov.

May 3, 2004


Donald L. Storm
Patent Examiner
Art Unit 2654